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(54) PRINTED MATTERPRINTING SYSTEM AND READER

(57)Abstract:

PROBLEM TO BE SOLVED: To provide printed mattera printing system and a reader facilitating the authenticity discrimination of the printed matter.
SOLUTION: Print information 11 such as an amount of money printed on a security or the like is ciphered by using a ciphering key 9 by a ciphering means 3 and turned to ciphered information 13. The ciphered information 13 is converted into a two-dimensional barcode 15 by a two-dimensional barcode conversion means 5. By a printing means 7the print information 11 and the two-dimensional barcode 15 are printed on the same paper surface and the printed matter 21 such as the security is prepared. The printed two-dimensional barcode 15 is read by a two-dimensional barcode read means 41 and the read information is deciphered by a deciphering means 43 and displayed by a display means 47. The displayed information and the print information 11 are collated and authenticity is discriminated.

CLAIMS

[Claim(s)]
[Claim 1]Printed matterwherein a code characterized by comprising the following is printed.
Predetermined printed information.
Encipherment information which enciphered said printed information.

[Claim 2]The printed matter according to claim 1wherein said code has further the information used as a decryption key for decrypting said enciphered information.
[Claim 3]The printed matter according to claim 1 or 2wherein said code consists of two-dimensional bar codes.
[Claim 4]A printing system comprising:
An encoding means which enciphers predetermined text.
A code conversion means which changes said enciphered information into a code.
Said text.
A printing means which prints said changed code.

[Claim 5]A printing system comprising:
An encoding means which enciphers predetermined text.
Said enciphered information.
A code conversion means which changes information used as a decryption key for decrypting said enciphered information into a code.
A printing means which prints said text and said changed code.

[Claim 6]The printing system according to claim 4 or 5wherein said code consists of two-dimensional bar codes.
[Claim 7]A reader comprising:
A reading means which reads a code.
A decoding means which decrypts encipherment information included in information read by said reading meansand a displaying means which displays information decrypted by said decoding means.

[Claim 8]The reader according to claim 6wherein said decoding means has further a decryption key acquisition means which acquires decryption key information included in said code.
[Claim 9]The reader according to claim 7 or 8wherein said code consists of two-dimensional bar codes.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the printing system for printing the printed matter which printed the printed information printed by a gold

notesecurityetc.for example and the code which enciphered this printed information on the same spaceand this printed matterand the reader which reads the printed code.

[0002]
[Description of the Prior Art]The critical information of a namethe amount of moneyetc. is printed by the gold note and the security. By the formerthe high speed printer is used for printing of these gold notesa securityetc.

[0003]
[Problem(s) to be Solved by the Invention]Howeverin many casesprinting by a high speed printer is only fixing the toner to space. Thereforeby failing to delete a tonerchange of the printed information of the amount of money etc. can be performedand there is a fault that it will be able to alter easily.

[0004]Thereforein order to have performed truth-or-falsehood distinction of printed informationthe person in charge had to compare the ledger currently kept based on the security number etc. one by one. Time and effort and time require this workandas for itthe big burden was placed on the person in charge.

[0005]This invention was made in view of such a problemand there is in providing the printed matterprinting systemand reader which make easy truth-or-falsehood distinction of printed matter.

[0006]
[Means for Solving the Problem]In order to attain the purpose mentioned abovethe 1st invention is printed matterwherein a code which has predetermined printed information and the encipherment information which enciphered said printed information is printed.

[0007]In the 1st inventionit can alter difficult by printing a code which has the encipherment information which enciphered printed information. When carrying out truth-or-falsehood distinction by printing with printed informationit becomes unnecessary to compare a ledger.

[0008]In this specificationa one-dimensional bar codea two-dimensional bar codeetc. are included with a code. A two-dimensional bar code is a bar code which has information in the direction of two dimensionsand there is the feature that information density is higher than a one-dimensional bar code.

[0009]The 2nd invention is a printing system possessing a printing means which prints an encoding means which enciphers predetermined texta code conversion means which changes said enciphered information into a codesaid textand said changed code.

[0010]Text which should be printed by an encoding means is enciphered in the 2nd invention. And enciphered information is changed into a code by a code conversion means. By a printing meanstext and a code are printed and printed matter is created.

[0011]An encoding means as which the 3rd invention enciphers predetermined textand said enciphered informationIt is a printing system possessing a printing means which prints a code conversion means which changes information used as a decryption key for decrypting said enciphered information into a codesaid textand

said changed code.

[0012]Text which should be printed by an encoding means is enciphered in the 3rd invention. And by a code conversion meansenciphered information and information used as a decryption key for decrypting enciphered information are changed into a code. By a printing meanstext and a code are printed and printed matter is created.

[0013]The 4th invention is a reader possessing a reading means which reads a codea decoding means which decrypts encipherment information included in information read by said reading meansand a displaying means which displays information decrypted by said decoding means.

[0014]A code printed by reading means is read in the 4th invention. Encipherment information included in read coded data by decoding means is decrypted. Information decrypted by a displaying means is displayed.

[0015]

[Embodiment of the Invention]Hereafterbased on a drawinga 1st embodiment of this invention is described in detail. Drawing 1 is a block diagram explaining the outline of the printing system concerning an embodiment of the invention. A printing system has the computer 1 and the printing means 7. The computer 1 has the encoding means 3 and the two-dimensional bar code conversion method 5. The computer 1 has the function to incorporate the printed information 11 from the database (not shown) prepared separately.

[0016]The encoding means 3 has an enciphered program and enciphers using the enciphering key 9. Whichever of the public key system with which an enciphering keyand the common key method (secret key method) with same decryption key and an enciphering key differ from a decryption key may be used for the method of encryption.

[0017]DES (Data Encryption Standard)Triple DESRC2RC4IDEASkipjacketc. are mentioned to the algorithm used by a common key method.

[0018]The two-dimensional bar code conversion method 5 changes the inputted information into the image data of a two-dimensional bar code. The thing of various kindssuch as a thing of matrix typessuch as QR Codeand a thing of the stack type of PDF417 gradecan be used for a two-dimensional bar code. Other things may be used although the computer 1 is used here as what realizes the encoding means 3 and the two-dimensional bar code conversion method 5.

[0019]The printing means 7 consists of printersfor exampleand prints the inputted print data.

[0020]It explains taking the case of the case where a security as shown in drawing 2 is printed. In the security of drawing 2textsuch as a security numbera security namea namean addressand the amount of moneyis printed. The text printed is called the printed information 11.

[0021]Firstinformation to encipher among the printed information 11 is enciphered by the encoding means 3 using the enciphering key 9. The information to encipher can consider the personal information on what requires high security naturefor examplea namean addressetc.the amount of moneyetc. Or all the printed

information may be enciphered.

[0022]The input of the information which should be enciphered reads the character which could input from the input means of a keyboard etc. or was printed by lower printing etc. with a character readerand it may be made to transmit to the encoding means 3. Or the information which should be enciphered among the printed information 11 is specified beforehandand it may be made to send only the information into the encoding means 3 by computer 1.

[0023]When encipheringmultiplex encryptionsuch as double encryptionmay be carried out. Therebyconfidentiality can be improved. The enciphered information is called the encipherment information 13.

[0024]Nextthis encipherment information 13 is made into the two-dimensional bar code 15 by the two-dimensional bar code conversion method 5.

[0025]The layout information 17 is doubled with the two-dimensional bar code 15 and the printed information 11and it is considered as the print data 19. Hereit is the information about the crest's layout which each character arranges and is printed in a security in the layout information 17.

[0026]The print data 19 are printed by the printing means 7and the printed matter 21 as shown in drawing 2 is created. With the security shown in drawing 2the two-dimensional bar code 15 is printed with the printed information 11 on the same space.

[0027]Nextdistinction of the truth or falsehood of the printed security is explainedreferring to drawing 3 and drawing 4. Drawing 3 is a perspective view showing the outline composition of the reader 31 used for distinction. Drawing 4 is a block diagram for explaining the function of the reader 31.

[0028]The reader 31 has the reading part 33 at the rear faceand has the keyboard 35 and the indicator 37 on the surface. The reading part 33 has a light sourcea photo detectoretc.and reads a two-dimensional bar code. The element in which the program for decoding a two-dimensional bar code and the program for decrypting coding information were included is built in the reader 31.

[0029]The keyboard 35 has the composition that a numbera signetc. can be inputted. The decryption key which is needed with the keyboard 35 when decrypting a code can be inputted. The indicator 37 has a liquid crystal display etc.for exampleand displays the decrypted information.

[0030]The two-dimensional bar code reading means 41 in the block diagram of drawing 4 is equivalent to the program for decoding the two-dimensional bar code built in the reading part 33 and the reader 31.

[0031]The decoding means 43 in the block diagram of drawing 4 is equivalent to the program for decrypting the coding information built in the reader 31. The decryption key input means 45 in the block diagram of drawing 4 and the displaying means 47 are equivalent to the keyboard 35 and the indicator 37respectively.

[0032]Operation of distinction is explained. Firstthe information included in the two-dimensional bar code 15 by the two-dimensional bar code reading means 41 is read. The encipherment information 13 is included in the read information.

[0033]The encipherment information 13 is decrypted by the decoding means 43. At

this timea decryption key is inputted by the decryption key input means 45. The decrypted information is displayed by the displaying means 47.

[0034]A worker compares the contents and the printed information 11 which were displayed. The security will be a genuine article if both are in agreement. The security is imitation if not in agreement. As mentioned abovetruth-or-falsehood distinction can be carried out.

[0035]Thussince it differs from the information which read and decrypted the two-dimensional bar code 15 when the printed information 11 is alteredit can distinguish from imitation easily. Since it is enciphered even if it is going to alter the two-dimensional bar code 15it is impossible. Since guilloche pattern printing which is the substrate printing for the prevention from an alteration is performed to the security even if it copies a security using a color copy device etc.generally forgery is also difficult.

[0036]Thereforeaccording to this embodimenttruth-or-falsehood distinction of the printed matter 21 which requires security naturesuch as a securitycan be performed easily in a short time. Like beforesince it is not necessary to check a ledger etc.a person's in charge burden becomes very lightand working efficiency can also be improved substantially. Since it is immediately revealed even if printed information is alteredthe effect of the prevention from an alteration is also expectable.

[0037]Furthermore by this embodimentthe two-dimensional bar code with information density high as a code which has encipherment information is adopted. It is possible to be able to make a display space smallto utilize space other than the printing unitand to print encipherment information from this. Thereforeit is possible for it not to be necessary to enlarge size of printed matterand to choose the same size as elegance conventionally.

[0038]According to this embodimentcollating work cannot be performedif it does not have the decoding means 43 even if the reader 31 has the two-dimensional bar code reading means 41. That isonly the program for decoding of the two-dimensional bar code is built inand information is not acquired even if it reads a two-dimensional bar code using the reader with which the decoded program is not incorporated. From thisonly with the limited reader 31truth-or-falsehood distinction work can be performed and the security nature of this work itself can also be maintained.

[0039]The above-mentioned example explained the input of the decryption key as what is performed from the keyboard 35. As other methodsthe decryption key is beforehand built into elementssuch as ROMand it may constitute so that it may transmit to the decoding means 43.

[0040]Nexta 2nd embodiment of this invention is describedreferring to drawing 5. According to this embodimentunlike a 1st embodimentthe point that decryption key information is included in the two-dimensional bar code printed explains focusing on this point. About the same point as a 1st embodimentexplanation is omitted in part.

[0041]Also in this embodimentthe example which prints and creates a security as

shown in drawing 2 like a 1st embodiment is explained. A printing system has the encoding means 3the two-dimensional bar code conversion method 5and the printing means 7 as well as a 1st embodiment. Since the function of each means is as above-mentionedit omits explanation. Also in this embodimentwhichever of a common key method (secret key method) and a public key system may be used.

[0042]Information to encipher among the printed information 11 is enciphered by the encoding means 3 using the enciphering key 9. And this encipherment information and the information used as the decryption key 51 are made into the two-dimensional bar code 55 by the two-dimensional bar code conversion method 5.

[0043]The layout information 17 is doubled with the two-dimensional bar code 55 and the printed information 11and it is considered as the print data 59. The same operation as a 1st embodiment is performedand the printed matter 51 is created.

[0044]The two-dimensional bar code 55 is printed with the printed information 11 on the same space by the printed matter 51. The two-dimensional bar code 55 has the encipherment information 13 and the information on both decryption keys 51.

[0045]The truth-or-falsehood distinction in this embodiment is explained. The program for the reader in this embodiment to acquire a decryption key to the reader 31 is built in. For this reasonthe keyboard 35 is not necessarily required.

[0046]Drawing 6 is **** with the functional block diagram for explaining truth-or-falsehood discriminating operation. It is equivalent to a program for the decryption key acquisition means 65 in drawing 6 to acquire the above-mentioned decryption key. The decryption key acquisition means 65 is included in the decoding means 63.

[0047]Operation of distinction is explained. Firstthe information included in the two-dimensional bar code 15 by the two-dimensional bar code reading means 41 is read. The encipherment information 13 and the decryption key 51 are contained in the read information.

[0048]The decryption key acquisition means 65 distinguishes the encipherment information 13 and the decryption key 51and acquires the decryption key 51. The decoding means 63 decrypts the encipherment information 13 using the decryption key 51. The decrypted information is displayed by the displaying means 47.

[0049]A worker compares display information and the printed information 11 like a 1st embodimentand performs truth-or-falsehood distinction.

[0050]As mentioned aboveaccording to this embodimentin addition to a 1st embodimentthe following effects are acquired. Since decryption key information is included in the two-dimensional bar code 55the time and effort which inputs a decryption key in the case of decryption can be savedand speeding up of work can be attained with laborsaving.

[0051]In a 1st embodimentwhen a decryption key is built into ROM etc.and ROM is damagedtrouble arises in decryptionbut according to this embodimentthere are no such worries.

[0052]When performing collating worka means to recognize the printed information 11 is formed and it may be made to compare the recognized printed information 11 and the decrypted information automatically in a 1st and 2nd embodiment of the

above. According to this compositionthe time and effort in which a worker does comparative collation one character at a time can be savedand it is saved laborand collating work is immediately executable.

[0053]The two-dimensional bar codes 15 and 55 can also be printed on the design of a securityor a guilloche pattern. In this caseit is preferred to print a design and a guilloche pattern with a drop out colorand to print the two-dimensional bar code 15 by colors other than a drop out color in consideration of the specification of the two-dimensional bar code reading means 41.

[0054]For examplethe light source of the two-dimensional bar code reading means 41 emits a near-infrared lightand suppose that the filter and the sensor also corresponded to the near-infrared zone. In this casea design and a guilloche pattern are printed in the ink of a color which often reflects a near-infrared lightandas for the two-dimensional bar codes 15 and 55it is preferred to print in the ink of the color which absorbs a near-infrared light well.

[0055]

[Effect of the Invention]As mentioned aboveas explained in detailaccording to this inventionthe printed matterprinting systemand reader which make easy truth-or-falsehood distinction of printed matter can be provided.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The block diagram explaining the outline of a 1st embodiment of this invention

[Drawing 2]The mimetic diagram showing an example of printed matter

[Drawing 3]The perspective view showing the outline composition of a reader

[Drawing 4]The functional block diagram concerning a 1st embodiment of this invention

[Drawing 5]The block diagram explaining the outline of a 2nd embodiment of this invention

[Drawing 6]The functional block diagram concerning a 2nd embodiment of this invention

[Description of Notations]

3 ————————— Encoding means

5 ————————— Two-dimensional bar code conversion method

7 ————————— Printing means

9 ————————— Enciphering key

11 ————————— Printed information

13 ————————— Encipherment information

15 ————————— Two-dimensional bar code

21 ————————— Printed matter

31 ————————— Reader

41 ————————— Two-dimensional bar code reading means

43 ——————— Decoding means
45 ——————— Decryption key input means
47 ——————— Displaying means